Organisms and Their Environment

4-2 Students will demonstrate an understanding of the characteristics and patterns of behavior that allow organisms to survive in their own distinct environments. (Life Science)

4.2.4 Distinguish between the characteristics of an organism that are inherited and those that are acquired over time.
Taxonomy level: 4.1-B Analyze Conceptual Knowledge

Previous/Future knowledge: In kindergarten (K-2.3), students learned that animals and plants look like their parents. In 3rd grade (3-2.2), students explained how physical and behavioral adaptations allow an organism to survive. Students have not previously identified characteristics as inherited or learned over time. This concept will be further developed in 6th grade when students explain how plants respond to external stimuli (dormancy and tropisms) (6-2.8) and compare learned and inherited behaviors in animals (6-3.7). In 7th grade (7-2.7), students will distinguish between inherited traits and those acquired from environmental factors.

It is essential for students to know that some characteristics that organisms have are *inherited* (come from their parents) and some can be acquired over the lifetime of that organism. These characteristics may be physical or behavioral.

Physical Characteristics
Some physical characteristics of organisms are passed from parents to their offspring (*inherited*).
- Some examples of animal characteristics may be type and color of body coloring, type and shape of sensory organ, or body structure.
- Some examples of plant characteristics may be type of leaf, color of flowers, or type of fruit.

Some physical characteristics of organisms change over the life of the organism.
- Some examples of animal characteristics may be weight, hair length, or changes due to injury.
- Some examples of plant characteristics may be number of leaves, length of roots, or amount of branching.

Behavioral Characteristics
A *behavior* is a response to a change in the environment. Both plants and animals respond to their environment.
Plants respond to light, water, gravity, and touch. Some examples of ways in which plants respond to their environment may be:
- Their roots grow down, while stems grow up.
- Vines will grow up a support; or some leaves close up when touched.
- Leaves grow toward the light.

Animals are born with certain behaviors that allow them to survive. In animals, these behaviors are called *instincts*. Some examples of animal instincts may be
- A duck knowing how to swim across the lake without being taught.
- Different birds build different types of nests without being taught how.
- Migration and hibernation are also instincts.

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Animals can also acquire behavioral characteristics as they grow and develop. These characteristics are usually in response to environmental conditions and are a result of learning.

- *Learning* is a change of behavior resulting from specific experiences.
- Unlike instinctive behaviors, learned behaviors are shaped by experience.
- Some examples of learned behaviors may be:
  - A dog can learn to roll over on command.
  - A baby bird is taught to fly by its parent.
  - A bear learns to fish for food.

It is not essential for students to summarize how these behaviors influence the survival of an organism. Students do not need to identify specific tropisms or dormancy in plants.

Assessment Guidelines:
The objective of this indicator is to *distinguish* between inherited characteristics and those that are acquired over the organism's lifetime; therefore, the primary focus of assessment should be to decide from the presented material which characteristics, physical and/or behavioral are inherited and which are acquired or learned. However, appropriate assessments should also require students to *infer* a type of characteristic, physical or behavioral, from presented information; *exemplify* inherited and acquired physical or behavioral characteristics; or *identify* the physical or behavioral characteristic as inherited and acquired based on its description.